DETAILED ACTION

This is a non-final office action in response to applicant's request for continued examination filed on February 10, 2011. Claim 1 is currently amended. Claims 21-22 are added as new claims. Claims 1, 3-4, and 6-22 are still pending review in this action.

New Grounds of rejection

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

   a. Claim 22 recites the limitation "the circumferential membrane" in line 2. There is insufficient antecedent basis for this limitation in the claim.

      i. Examiner has interpreted this to be circumferential web.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 6-11, 13, 17-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Filser et al. (Wipo Publication WO 2002/045614) in view of Bodenmiller et al. (USP No. 6,495,073) in further view of Suttor et al. (Wipo Publication WO 2003/041606) in further view of Hintersehr (DE 44 36 231 A1).

4. **Examiner is using Filser et al. (USP No. 7,077,391) as an English language equivalent of lieu of WO 2002/045614**.

5. **Examiner is using Suttor et al. (US Pre-Grant Publication 2005/0019121) as an English language equivalent of lieu of WO 2003041606**.

6. Regarding claim 1, Filser teaches a method for producing a dental piece using a milling operation. **(See abstract and Figures 7, 10, and 11)**.

a. Filser goes onto teach the method comprising:

i. Milling (shape cutting) a mold blank to form a molded piece.

(1) **See figures 7, 10, and 11**

(2) **See Column 5 lines 29-32**

ii. Working the mold blank to form a workpiece with holding webs surrounding and holding the workpiece to the blank.

(3) **See figures 7, 10, and 11 → see part 20**

(4) **See Column 5 lines 29-34**

(5) **See holding segments (webs) in abstract→ teaching that the number of holding segments (webs) can be freely selected and can be in the area of the frame which is located around the circumference of the blank.**

iii. Wherein the holding webs are formed on the outer boundary of the molded piece.

(6) **See figures 7, 10, and 11 → see parts 20 and 22**

(7) **See Column 5 lines 29-34**

iv. Wherein the holding webs are located around the area of the largest extent of the molded piece.

(8) **See figures 7, 10, and 11 → see parts 20 and 22.**

(9) **See Column 5 lines 29-34**

(10) **See specifically figure 7 which shows that the webs are formed on the widest part of the molded piece.**

(a) This is the area of the largest extent.

v. Separating the web to recover the molded piece.

(11) **See column 5 lines 45-48**

b. With respect to claim 1, Filser does not expressly teach: (1) wherein the working step works the inner and outer contour of the molded piece; (2) wherein the splitting step is done by circular milling; and (3) wherein the circumferential web (holding web) contacts the molded piece around the entire periphery of the molded piece.

c. However, Bodenmiller teaches wherein the inner and outer contours of a blank are worked in order to form a dental piece.

vi. **See abstract and column 9 lines 3-7.**

vii. **It would have been obvious to one having the ordinary skill in the art to combine Filser and Bodenmiller because the use of computer technology (CAD/Cam unit) is well known to be used in conjunction with milling operations and would be designed to work the entire molded piece in one operation.**

d. With respect to claim 1, the combination of Filser and Bodenmiller does not expressly teach: wherein the splitting step is done by circular milling.

viii. However, Filser teaches that in working a molded piece from blank, special tools such as milling tools, drilling tools, and grinding tools are used. **(See column 1 lines 38-45)**.

ix. Suttor further teaches that circular milling is well known in forming dental molded pieces and is one of many milling techniques used to work a molded piece from a blank. **(See paragraph 0008, 0059, and 0061)**.

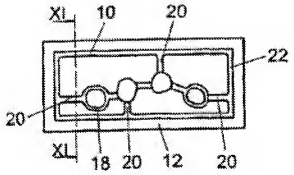
(12) In this case, one having the ordinary skill in the art would use circular milling techniques to cut all the webs circumferentially surrounding the molded piece.

x. Obviously the milling tool would have to be at a sufficient depth to cut/mill the remaining portions.

e. The combination of Filser, Bodenmiller, and Suttor do not teach wherein the circumferential web (holding web) contacts the molded piece around the entire periphery of the molded piece.

xi. However, Filser teaches wherein the workpiece (molded piece) is extended from the blank via holding webs. **(See column 3 lines 55-60)**. Filser goes on to teach that these holding webs (circumferential webs) can be freely selected according to position and number. **(See column 3 lines 55-60)**

(13) Thus it would have been obvious to one having the ordinary skill in the art that increasing the number of webs and designing the location of the webs would be along the periphery and designed on a case by case basis depending on the piece being produced. Below is a before and after of figure 10 of Filser showing how additional webs would be positioned. Upon close review, additional holding webs are still connected to blank portion 22 which would be around the entire periphery of the molded piece.



f. Furthermore, Hintersehr teaches that a circumferential web (plastic ring) can be placed around an object to be molded into a dental object. **(See part 20 in figures 1-2 and 4-5)**. This plastic ring contacts the molded article on the entire periphery which allows it to be held to a mold blank support (1). **(See figures 1-2)**.

xii. It would have been obvious to one having the ordinary skill in the art that a plastic ring or circumferential web left around an article to be molded would allow the inner and outer contour of the dental piece to be worked while providing excellent stability. **(See figure 5)**.

7. Regarding claim 6, Filser does not expressly teach wherein the outer and then the inner contours are worked or alternatively the inner and the outer contours are worked.

g. However, Bodenmiller teaches wherein the inner and outer contour can be worked or vice versa during the machining (milling) operation. **(See column 9 lines 3-15)**.

h. It would have been obvious to one having the ordinary skill in the art to work the inner or outer contours of the dental workpiece, as it is well known in the

art to use a milling program to design a milling process which can continuously mill a molded workpiece.

8. Regarding claim 7 and 9, the combination of Filser and Bodenmiller does not expressly teach wherein rough milling is carried out first and then fine milling using a meander shaped and circular strategy respectively.

i. However, Suttor teaches that when milling a dental workpiece a rough milling is done first followed by a fine milling. **(See paragraph 0065)**. Suttor also discloses various milling strategies than can be interchanged such as circular and zigzag (meandering). **(See paragraph 0013 and 0061)**. Fine milling is the last machining operation.

j. It would have been obvious to one having the ordinary skill in the art to do fine milling after rough milling in order to ensure that the end product has minimal defects (smooth). Especially when dealing with dental pieces, a smooth or defect free piece is a chief concern. As stated by Suttor the milling strategy is interchangeable and would be optimized by one having the ordinary skill in the art depending on the size and configuration of the piece to be formed.

9. Regarding claim 8, the combination of Filser and Bodenmiller does not expressly teach wherein smoothing occurs prior to part extraction (web is split).

k. However, Suttor teaches that when milling a dental workpiece a rough milling is done first followed by a fine milling. **(See paragraph 0065)**.

l. Applicant has disclosed that fine milling is a smoothing operation. **(See page 5 lines 1-4 of applicant's specification)**.Thus the fine milling operation is smoothing while the piece is being worked out of the blank.

10. Regarding claim 10 and 13, Filser teaches that after the milling steps the workpiece is ground smooth. **(See column 5 lines 47-48)**.

m. Additionally, Suttor teaches a finishing process which uses milling tools similar to the milling process to finish (smooth) the formed article. **(See paragraph 0070)**.

xiii. It would have been obvious to one having the ordinary skill in the art to use the same tools as used in the milling process to finish (clean or smooth) a molded piece in order to reduce equipment costs.

11. Regarding claim 11, Filser does not teach wherein the molded piece is caught on a padded retainer after the web is split.

n. However, Bodenmiller teaches wherein a dental workpiece can be extracted by using a collecting dish (part number 8) in conjunction with a fluid mat (part number 7). **(See figure 7 and column 8 lines 46 to 60)**.

xiv. The dental workpiece extracted or removed from Bodenmiller is caught in a position underneath its position in the mold blank through a wax melting procedure. This wax melting procedure will allow for the dental workpiece to fall out of the mold at a slower pace, thus weakening the impact of the workpiece against the fluid mat. The extraction assembly

utilized by Bodenmiller is a common solution to the problem of eliminating post fabrication defects to a workpiece.

xv. While Bodenmiller does not explicitly teach the use of a padded receptacle, Bodenmiller does teach the use of a receptacle to catch the milled workpiece. Thus, it would be obvious to catch the machined workpiece is a padded container because one skilled in the art would want to ensure that the workpiece would have no defects from contacting a hard surface and causing an abrasion onto the workpiece. A defect free workpiece is sought after in the dental cap art and one would have been motivated to ensure that the workpiece was not scratched.

12. Regarding claim 17, Filser teaches that milling machines have the ability to move along three axes. **(See column 1 lines 55-58)**.

o. See also Suttor, disclosing wherein milling machines for dental applications have moveability in 3 axes. **(See paragraph 0015)**.

13. Regarding claims 18-19, Filser teaches that blanks can be made of aluminum oxide and zircon oxide in the green (pre-sintered) or sintered state. **(See column 2 lines 39-49)**.

14. Regarding claim 21, Filser does not expressly teach wherein the circumferential web is non-perforated.

p. However, Hintersehr teaches that a circumferential web (solid plastic ring) can be placed around an object to be molded into a dental object. **(See part 20 in figures 1-2 and 4-5)**. This plastic ring contacts the molded article on the entire

periphery which allows it to be held to a mold blank support (1). **(See figures 1-2)**.

xvi. It would have been obvious to one having the ordinary skill in the art that a plastic ring or circumferential web left around an article to be molded would allow the inner and outer contour of the dental piece to be worked while providing excellent stability. **(See figure 5)**.

15. Claims 3-4, 12, 14-16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Filser et al. (Wipo Publication WO 2002/045614) in view of Bodenmiller et al. (USP No. 6,495,073).

16. Regarding claims 3 and 4 (these claims depend on claim 12 below), Filser does not expressly teach wherein the webs (membrane) are split by manual pressure or a knife tool (scalpel).

q. However, Bodenmiller teaches wherein manual separation is known in the art for removing a workpiece from a blank. **(See column 2 lines 11)**.

xvii. It would have been obvious to one having the ordinary skill in the art to remove workpiece by manual pressure as after a milling procedure only a small portion of the workpiece is connected to a blank. Additionally, the use of a knife tool would be used since the gap between the blank and the piece may be small (as seen in Filser).

17. Regarding claim 12, Filser teaches a method for producing a dental piece using a milling operation. **(See abstract and Figures 7, 10, and 11)**.

r. Filser goes onto teach the method comprising:

xviii. Milling (shape cutting) a mold blank to form a molded piece.

(14) **See figures 7, 10, and 11**

(15) **See Column 5 lines 29-32**

xix. Working the mold blank to form a workpiece with holding webs surrounding and holding the workpiece to the blank.

(16) *It is examiner's position that the plurality of holding webs surrounding the molded piece can be considered to be a continuous structure with gaps therebetween. These gaps are the spaces seen in figure 10 between each of the web portions 20. The number of webs would be optimized depending on the weight and size of the object that is milled. Thus, the surrounding holding web structure is considered to be the circumferential membrane because the spaces between the holding webs can be considered to be a perforation.*

(b) **See figures 7, 10, and 11 → see part 20**

(c) **See Column 5 lines 29-34**

(d) **See holding segments (webs) in abstract→ teaching that the number of holding segments (webs) can be freely selected and can be in the area of the**

frame which is located around the circumference of the blank.

xx. Separating the web to recover the molded piece.

(17) **See column 5 lines 45-48**

s. With respect to claim 12, Filser does not expressly teach wherein the inner and outer contour of the molded piece is worked and wherein the holding webs are between 50-500 microns (.05-.5 mm).

t. However, it would have been obvious to one having the ordinary skill in the art to make the holding webs as small as possible to allow for ease of material separation. Filser teaches that the connections (holding webs) are machined (milled) until the connection between the workpiece and the residual blank material becomes weaker and weaker. **(See column 3 lines 62-67)**. As dental work pieces are small in nature (roughly 25 mm or 1 inch) it would have been obvious to one having the ordinary skill in the art to optimize the process to continue machining to form weaker points of contact which can still function to hold the workpiece in place.

u. However, Bodenmiller teaches wherein the inner and outer contours of a blank are worked in order to form a dental piece.

xxi. **See abstract and column 9 lines 3-7**.

xxii. It would have been obvious to one having the ordinary skill in the art to combine Filser and Bodenmiller because the use of computer technology (CAD/Cam unit) is well known to be used in conjunction with

milling operations and would be designed to work the entire molded piece in one operation.

18. Regarding claim 14, Filser teaches a perforation or gap between the webs. **(See figure 10)**.

v. A slot is nothing more than a depression, perforation, aperture, or opening. Therefore, the gaps in figure 10 of Filser would qualify as a slot.

19. Regarding claims 15-16, Filser does not teach: (1) wherein the three elongated through holes have a length LD are formed following an elbow or elbow-like section, and wherein a dividing connection is present between two adjacent through holes and (2) wherein the relationship between the LD and the LV is $1:20 \leq LV : LD \leq 1:5$.

w. **However, Filser discloses multiple through holes which have divided connections (webs) placed there between. Although the size and design of the holes are not disclosed, it would have been routine optimization for one having the ordinary skill in the art to machine the webs in order to form the most efficient web for the forming system**. Filser goes on to teach wherein that holding webs can be freely selected according to position and number. **(See column 3 lines 55-60)**.

20. Regarding claim 20 Filser teaches

x. Wherein the holding webs are formed on the outer boundary of the molded piece.

xxiii. **See figures 7, 10, and 11 → see part 20**

xxiv. **See Column 5 lines 29-34**

y. Wherein the holding webs are located around the area of the largest extent of the molded piece.

xxv. **See figures 7, 10, and 11 → see part 20**

xxvi. **See Column 5 lines 29-34**

xxvii. **See specifically figure 7 which shows that the webs are formed on the widest part of the molded piece.**

(18) This is the area of the largest extent.

21. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Filser et al. (Wipo Publication WO 2002/045614) in view of Bodenmiller et al. (USP No. 6,495,073) in further view of Hintersehr (DE 44 36 231 A1)..

22. Regarding claim 22, the combination of Filser, Bodenmiller, and Hintersehr does not expressly teach wherein the circumferential membrane contacted the molded piece around the entire periphery of the molded piece.

z. However, Hintersehr teaches that a circumferential web (plastic ring) can be placed around an object to be molded into a dental object. **(See part 20 in figures 1-2 and 4-5)**. This plastic ring contacts the molded article on the entire periphery which allows it to be held to a mold blank support (1). **(See figures 1-2)**.

aa. It would have been obvious to one having the ordinary skill in the art that a plastic ring or circumferential web left around an article to be molded would

allow the inner and outer contour of the dental piece to be worked while providing excellent stability. **(See figure 5)**.

Response to Arguments

23. Applicant's arguments with respect to claims 1, 3-4, and 6-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is (571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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